Claims

1. An arrangement comprising a light-emitting power semiconductor device (3) disposed on a substrate structure (1) and comprising a plastic protective body (9), which

- is formed by injection onto said substrate structure (1) and
- shrouds said power semiconductor device (3) substantially form-fittingly on the sides and top thereof, leaving a light exit region (8) exposed,

and comprising an optical waveguide (8) that is coupled to said light-emitting power semiconductor device (3) and that guides the emitted light out of said plastic protective body (9),

characterized in that

the region between said light-emitting power semiconductor device (3) and said optical waveguide (8) is filled, at least segmentally, with a transparent plastic material.

2. The arrangement as recited in claim 1,

characterized in that

filler particles, especially glass particles, dispersed in said plastic protective body (9) are present in order to adapt the thermomechanical properties of the material of said plastic protective body to the thermal expansion of said power semiconductor device.

3. The arrangement as recited in either of claims 1 and 2,

characterized in that

said plastic protective body (9) is made of a substantially opaque plastic material.

4. The arrangement as recited in any of the preceding claims,

characterized in that

said plastic protective body (9) is made of a thermoplast or a duroplast.

5. The arrangement as recited in any of the preceding claims,
characterized in that
said substrate structure (1) is a singulated part, particularly a stamped part, made from a panel-shaped or strip-shaped metal sheet, particularly a lead frame.

6. The arrangement as recited in any of the preceding claims,
characterized in that
said substrate structure (1) is in thermal contact with a coolant, particularly water, which flows around or across at least a portion of its surface.

7. The arrangement as recited in Claim 6,
characterized in that
said substrate structure (1) is provided with a heat-exchange body comprising microchannels and/or microplates (6).

8. The arrangement as recited in claim 7,
characterized in that
said heat-exchange body is disposed in the immediate vicinity of said power semiconductor device (3), on the side of said substrate structure (1) facing away from said power semiconductor device (3).

9. The arrangement as recited in any of the preceding claims,
characterized in that
said optical waveguide (8) is provided on both of its longitudinal faces with a coating, particularly an SiO_2 coating, for beam guidance.

10. The arrangement as recited in any of the preceding claims,
characterized in that
an optical waveguide structure creating a plurality of individual optical waveguides is formed in said waveguide (8).

11. The arrangement as recited in claim 10,

characterized in that

with respect to an individual optical waveguide, the cross-sectional areas of the optical inlet and the optical exit differ in size, and/or, with respect to plural individual optical waveguides, the geometrical arrangement of the cross-sectional areas of the optical inlets is different from the geometrical arrangement of the cross-sectional areas of the exits.

12. The arrangement as recited in any of the preceding claims,
characterized in that
to effect the optical coupling of said optical waveguide (8) to said light-emitting power semiconductor device (3), a particularly reflective or diffractive lens is provided in the beam path between said power semiconductor device (3) and said optical waveguide (8).

13. The arrangement as recited in claim 12,
characterized in that
said lens realized as a cylindrical lens (7).

14. The arrangement as recited in any of the preceding claims,
characterized in that
said transparent plastic material is silicone.

15. The arrangement as recited in any of the preceding claims,
characterized in that
said light-emitting power semiconductor device (3) is a semiconductor laser, particularly a semiconductor laser bar.

16. A method for fabricating an arrangement comprising a light-emitting power semiconductor device,

wherein, in a first step, said light-emitting power semiconductor device (3) is placed against and electrically contacted by a substrate structure (1), and

in a second step that can be performed chronologically before or after the first step, an optical waveguide (8) is affixed to said substrate structure (1),

and in a third step, said substrate structure (1) with said light-emitting power semiconductor device (3) is injection-coated with a plastic mass forming said plastic protective body (9),

characterized in that

in the third step, said optical waveguide (8) is completely shrouded in said plastic protective body (9), and

in a fourth step, a light exit surface of said optical waveguide (8) is exposed in the region of the outer periphery of said plastic protective body (9).

17. The method as recited in claim 16,

characterized in that

said substrate structure is realized, at least in said first step, as a mounting area in a planar metal sheet (lead frame), and the separation of the metal sheet into the individual arrangements is effected in a subsequent singulating step.

18. The method as recited in either of claims 16 and 17,

characterized in that

as part of the fourth step, a projecting piece (16) of plastic material integrally formed on said plastic protective body is broken off to expose said light exit surface of said optical waveguide (8).

19. The method as recited in any of claims 16 to 18,

characterized in that

after said fourth step, the exposed light exit surface of said optical waveguide (8) is polished.